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Military Operations in Urban Terrain

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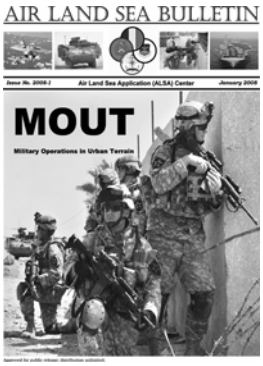

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IN HOUSE

FEATURE ARTICLES

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Cover photo—Soldiers from the 2nd Infantry Division conduct an area reconnaissance mission in Baghdad, by PO1Martin Anton Edgil, USN

Director's Comments—A New Look at MOUT

On behalf of the Air Land Sea Application (ALSA) Center, Happy New Year and thanks for your support. Our past year was busy as we completed numerous multi-Service tactics, techniques and procedures (MTTP) publications. Among the highlights, we updated: *Brevity* to further standardize communication; *Survival, Evasion and Recovery,* our quick survival reference guide; and *Tactical Employment of Nonlethal Weapons (NLW)* for commanders and staffs to plan and coordinate NLW employment. We added *Airfield Opening*, which provides planning and logistics considerations for opening an airfield. In the year ahead you can expect to see an update to *Joint Application of Firepower (JFIRE)* and *Tactical Convoy Operations (TCO)* with a re-organized flow from planning to execution. For TCO, we have also added new information on counter-improvised explosive devices (counter-IED) and counter-sniper operations. We will be adding the new publication *Strike Coordination and Reconnaissance (SCAR)* to streamline strike coordination for target destruction and/or efficient reconnaissance to support the ground commander, and a publication on integrating Conventional Forces and Special Operations Forces to enhance the effectiveness of inter and intra-Service coordination.

This issue of the *Air Land Sea Bulletin (ALSB)* focuses on military operations in urban terrain (MOUT). Given the topic, this *ALSB* contains a diversity of articles which provide thought-provoking viewpoints and TTP. We begin with Majors Jerome S. Morrison II and J.D. Williams who describe the Joint Effects Training (JET) model employed at the National Training Center (NTC), Fort Irwin, CA, to better prepare the brigade combat team (BCT) for deployment. Major Niel Smith's article is a reminder of the historical importance of armor in urban operations. Lieutenant Colonel Clint "Q" Hinote introduces the term "armed overwatch," comparing it to the Army's concept of overwatch by GEN William DePuy's ground forces in WWII as he illustrates a better way to describe the employment of airpower in close quarters for urban operations. Lieutenant Colonel John "Mugsy" Scotto from the Joint Multi-National Readiness Center, Hohenfels, Germany, highlights the benefits and challenges of integrating aircraft and indirect live fires with MOUT training. Gunnery Sergeant Will Falcon will add to your deployment certification with academics on new mirror-based sighting devices for small arms and the tactics to employ them skillfully. In our final article, Chief Warrant Officer 5 Warren Aylworth reminds us that battlefield innovation requires courageous leadership and he has got an idea to help increase your combat effectiveness in MOUT or any operation.

We bade farewell and swapped out some folks this quarter, so you need to make updates to your ALSA Center contact lists. Lieutenant Colonel Rob Murphy now works at United States Joint Forces Command, Lieutenant Colonel (S) Brady "Noid" Merrill walked back across the street to fly F-15Cs again with the 71st Fighter Squadron Ironmen, and Technical Sergeant Jorge Venegas retired after 20 years of service. We welcome Major Robert "Slab" Bradeen an F-16 instructor pilot from Luke AFB, AZ, going to the Land/Sea Branch, Major Carl Engstrom, an Army aviator from 29th ID, VA ARNG, Richmond, VA going to the Air Branch, TSgt(S) Christal Derricotte our new NCOIC, and Ms. Leila Joyce our new Office Automation Assistant (OAA).

The purpose of the *ALSB* is to "spread the word" while providing a forum for the cross-flow of information among the Services. At the end of the day, however, the cross-flow of information is intended for you the Soldiers, Sailors, Marines, Airmen, and Coast Guardsmen who live and work at the tactical level every day. A special thanks to the writers and we appreciate your feedback (good or bad) on the articles. Speaking of which, the theme for our May 2008 *ALSB* is "advisor teams working with foreign forces" with a suspense of 29 February 2008 for article submissions, and the theme for our September 2008 ALSB is "fires" with a suspense of 1 July 2008 for article submissions. Thank you and keep'em coming.

THOMAS JOSEPH MURPHY
Colonel, USA
Director

Joint Effects Training at the National Training Center

By
MAJ Jerome S. Morrison II, USA
and
MAJ J.D. Williams, USA
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Joint Effects Training (JET) is divided into three primary phases: preparation; observed fire training (OFT); and the synchronization of close air support (CAS), organic indirect fire (mortar and cannon fire), and electronic warfare (EW) assets.

The National Training Center (NTC) at Fort Irwin, California, proudly trains brigade combat teams (BCTs) to execute their mission essential tasks under very realistic combat conditions. The majority of the BCTs that train at the NTC are preparing to deploy to either Iraq or Afghanistan. A vital part of the training focuses on the synchronization and integration of joint and inter-service lethal and nonlethal assets. At the NTC, BCTs execute Joint Effects Training (JET) to develop and refine the multi-echelon skill sets needed to integrate available joint assets in the operational environment.

JET is divided into three primary phases: preparation; observed fire training (OFT); and the synchronization of close air support (CAS), organic indirect fire (mortar and cannon fire), and electronic warfare (EW) assets. The first two phases focus on the importance of synchronizing assets in a tactical environment. The final phase is designed to challenge the BCT staff to integrate the lethal and nonlethal assets available to the BCT. Additionally, this is the second phase of the joint fires observer (JFO) and joint terminal attack controller (JTAC) integration program. During each phase, observer controllers (OCs) work in partnership with the unit to ensure unit training objectives are met. Through this partnership, the most relevant doctrine, best practices, and current theater tactics, techniques and procedures are shared—all targeted at honing the unit's sensor-to-shooter linkage and skills.

During the preparation phase, the BCT organizes for combat, conducts rehearsals, and executes personnel and equipment pre-combat checks. In parallel, the JFOs and JTACs are training on the Indirect Fires – Forward Air Controller Trainer (IFACT). This simulator allows OCs to coach and refine calls for fire, while enforcing disciplined protocols for clear and concise communication with supporting aircrews. The OFT portion of the exercise allows the leadership an opportunity to deploy, establish digital communications within the BCT, and conduct simulated calls for fire for indirect fire. Integrating JFOs and JTACs is central to the results achieved during OFT since the integration of rotary wing (RW) and fixed wing (FW) assets into a seamless, synchronized effort remains the goal.

The final JET phase is driven by a 52d Infantry Division (NTC's notional divisional headquarters) target packet for the BCT staff. This packet provides time sensitive intelligence of a known Anti-Iraqi Force (AIF) cell leader, in a nearby town. The BCT is given the mission to neutralize the AIF cell leader.

Execution begins with an intelligence inject from the division G2, stating that the AIF cell leader has been spotted departing an adjacent town. Over the next few hours, the BCT staff receives a stream of division intelligence reports and observations from their organic observers overwatching the town. The supporting task goal is to integrate all available Joint Unmanned Aerial Systems (JUASs) in overwatch of the targeted area.

JFO observes MOUT site at JNTC (Photo courtesy of National Training Center)

The staff collects and analyzes reports from division and recommends target engagement. Options must be weighed to determine the optimal asset employment which achieves the desired target effect while minimizing collateral damage. The brigade has multiple CAS

assets which include US F-16 and coalition Mirage fixed wing aircraft; Army attack aviation; and UASs. During this phase of the exercise, all weapons effects are inert and are replicated through the NTC's fire marking team.

JET simultaneously trains forward-positioned JFOs and JTACs, helicopter aircrews, CAS aircrews, and the BCT staff. Members of the BCT directly involved with JET are the commander, deputy commander, S2, S3, fire support officer, brigade aviation officer, and brigade air liaison officer. JET forces analysis of residual effects from lethal operations. This analysis emphasizes consequence management which exercises the BCT Civil Military officer, Judge Advocate General, Public Affairs officer and the Information Operations officer.

Once the exercise is completed, after action reviews (AARs) are conducted with the aircrews, JTACs, JFOs, and BCT staff. AARs focus on mission execution, the decision process for employment of effects, and the synchronization of available assets. Consistent trends from recent rotations highlight that effective rehearsals are required, battle drills are necessary, and airspace management is a challenge.

- Units that conduct quality rehearsals prior to the JET are substantially more successful. Effective rehearsals integrate all elements of the BCT staff responsible for the target analysis and decision making recommendations forwarded to the commander.

- Many units do not have battle drills for the integration of joint assets. For those that do, staffs may not be familiar with the battle drills. BCTs that ensure their battle drills are disseminated and understood maximize this training opportunity. As a minimum, the CAS battle drill from FM 3-09.32, *JFIRE*, is a baseline battle drill to build upon.

- Units struggle with the mechanics of synchronizing multiple air platforms simultaneously. BCTs do not generally have an opportunity to stack platforms from ground level past 10,000 feet above ground level (AGL) as they do at the NTC and many struggle with the mechanics of airspace de-confliction.

Since this training is not easily replicated at home station, BCTs are afforded multiple opportunities to execute the final phase of JET training throughout an NTC rotation. Each JET iteration is scheduled to provide the unit an opportunity to conduct rehearsals, refine and review battle drills, practice airspace de-confliction, and integrate other lessons learned through the AAR process.

Effective synchronization of joint fires and effects can be realized through joint, integrated air-ground training, starting at home station and reinforced at the combat training centers (CTCs). Units focus on developing requisite planning and execution capabilities through a multitude of available resources and Mobile Training Teams: Joint Fires Observer Course (Fort Sill), air defense/air management (ADAM)/brigade aviation element (BAE) Course (Fort Bliss), and Joint Firepower Course (Nellis AFB). Training realism is maximized when coupled with increased support, diversity, and complexity enabled by the Joint Fires and Interoperability Team (JFIIT).

JET provides the brigade staff an excellent opportunity to practice critical C2 skills which support the employment and synchronization of joint assets in demanding situations, replicated at NTC. Much of the training is structured around an urban environment similar to the one that units will see in theater. This includes the complexities of the population interaction in markets, mosques, and local police stations. Units are required to plan for and manage collateral damage and consider effects on the population. All of which are critical skills when operating in and around an urban environment. Through tough, realistic training scenarios, deploying units are provided many opportunities to fill the joint training gaps currently identified by deployed commanders.

Units struggle with the mechanics of synchronizing multiple air platforms simultaneously. BCTs do not generally have an opportunity to stack platforms from ground level past 10,000 feet above ground level (AGL) as they do at the NTC and many struggle with the mechanics of airspace de-confliction.

The Armor Effect: The Surprising Utility of Armored Forces in Urban and Irregular Warfare

M1A1 in Baghdad (Photo courtesy of MAJ Niel Smith, USA)

By
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US Army Armor Center
Fort Knox, KY

"The new fight brings to light a cautionary message to the force—be wary of eliminating or reducing the option of heavy armor; it has proven decisive and has been the critical enabler that allowed TF Baghdad to win every fight, everyday."[1]

—LTG Peter W. Chiarelli,
Commander, Task Force Baghdad,
2004 -2005

When I attended the Armor Officer Basic Course in 1997, the Army was coming to grips with the role of Armor in an increasingly urbanized world. My instructors and NCOs were clear in their guidance to us young lieutenants—

"Tanks stay out of cities, go around". Some of this was understandable. Two years before, the armored community watched in horror as the Russian 131st Motor Rifle Brigade was annihilated by Chechen insurgents in Grozny on New Years Day. The Chechens had used tunnels, improvised explosive devices (IEDs), and rocket propelled grenades (RPGs) to inflict an estimated two thousand casualties on the Russian Army in 48 hours. This disaster reinforced the growing conventional wisdom that armor had little business in cities. I later learned that this aversion to armored operations was codified much earlier in the 1986 version of US Army Field Manual (FM) 90-8, *Counterguerilla Operations*, which stated,

"…armor forces are not particularly suited for use as maneuver combat elements in a counterinsurgency

[1] MG Chiarelli, MAJ Michaelis, MAJ Norman, "Armor in Urban Terrain: The Critical Enabler," *ARMOR*, March-April 2005, 7.

environment….Its capabilities are decreased and its vulnerabilities are increased in close and rough terrain. The difficulty in using armored forces results in an overall increase in vulnerabilities and a decrease in capabilities."[2]

The net effect of foreign disasters, conventional wisdom, and doctrine influenced major policy decisions regarding the future structure of the armor force. We were told the future was urban, and armor's utility in that environment was questioned. After 9/11, the successful execution of Operation ENDURING FREEDOM utilizing Special Forces and Marines further reinforced the view that the armored force was a dinosaur with limited utility in the modern urban conflict. The conventional wisdom was that lightly armored maneuver forces would take advantage of the latest in computers and electronics to defeat enemy forces at well beyond tank main gun range. The M1 tank was termed the "last" US main battle tank, and most funding for modernizing the tank fleet was redirected to other priorities.

It is strange that the US Forces evolved to this point, as any view of the US historical experience in urban combat reveals the necessity of including armor in urban combat operations. Armor's historical and spiritual ancestors in the frontier cavalry repeatedly proved in the 1800's to be some of the most useful general purpose counterinsurgency and stability units on the western frontier. World War II urban fighting in places such as Metz and Aachen demonstrated the need for close Armor-Infantry cooperation during urban fighting to reduce casualties. Developed in the crucible of combat, the synergy developed between the mounted and dismounted units resulted in fewer casualties and rapid advance. During the later parts of Vietnam, armored units were heavily employed in the restricted jungle and urban terrain and proved to have great success when working with infantry to combat organized NVA and VC units. Finally, in 1993 the US was famously forced to borrow armor units from Pakistan to retrieve the cut off members of the Special Forces and Rangers in Mogadishu in the famous "Black Hawk Down" incident. Why armor continued to be treated skeptically by MOUT tactics developers and policymakers remains a mystery, as well as the failure of armor and mechanized advocates to correct the conventional wisdom with the historical record.

[2] FM 90-8, *Counterguerilla Operations*, 1986, para 5-7.4.a.

OPERATION IRAQI FREEDOM AND ARMORED FORCES

Operation IRAQI FREEDOM completely reversed the conventional wisdom on the utility of armored forces in urban, counterguerilla and counterinsurgency operations. One of the first and most visible successes of armored forces was during the "Thunder Runs" into Baghdad from 7-9 April 2003. The armored columns of the 3d Infantry Division (3d ID) were able to penetrate to the heart of the city, battling irregular forces along the way. Though the fighting was close and intense, the 3d ID forces were able to topple the capital and avoid the much dreaded urban house battle that had been predicted. The Fedayeen and other Iraqi forces had simply been unable to successfully defeat the M1 Abrams and M2 Bradleys they faced and were overwhelmed by superior firepower.

Operation IRAQI FREEDOM completely reversed the conventional wisdom on the utility of armored forces in urban, counterguerilla, and counter-insurgency operations.

In the span of 2 days, the specter of the Russian armored defeat in Grozny gave way to a new appreciation on the utility of armored forces.

M1 on patrol (Photo courtesy of MAJ Niel Smith, USA)

Armored forces were called upon regularly between 2004 and 2007 to conduct counterguerilla operations in urban terrain. On 4 April 2004, a tank company from 1st Armored Division rescued a stranded infantry platoon cut off in Sadr City. The commander lead his men on a hasty assault through a gauntlet of the worst Iraqi insurgent weaponry—RPGs, IEDs, heavy machine

guns, and snipers—to rescue the cut off infantry. Tank commanders shot their carbines at flanking insurgents from the hatches while the gunners cleared the way ahead. Arriving at the convoy, the infantry loaded wounded on the back of the tanks, and the column was able to shoot its way out of the inferno without a single tank being disabled. Shortly thereafter 1st Cavalry Division flew in much of the armored forces they had left behind in Texas, initially believing them inappropriate for the counterinsurgency environment. Tanks were also employed decisively in coordination with infantry during the 2004 offensives in Karbala, Najaf, and Fallujah in some of the worst urban fighting seen this decade.

M1s in Baghdad (Photo courtesy of MAJ Niel Smith, USA)

These armor/infantry combined operations, together with a robust local leader engagement plan, set the conditions for the now-famous "Anbar Awakening"...

Of particular interest in the Iraq conflict is the unprecedented success of armored units conducting counter-insurgency operations. After the intense urban fights against Sunni insurgents and the Mahdi army in 2004, forward thinking Army commanders began focusing on more traditional counterinsurgency approaches. These operations followed the "Clear, Hold, Build" model of counterinsurgency, seeking to build cooperation with local security forces, focusing on dismounted patrolling to gain intelligence, and inhabiting local security stations rather than residing on large forward operating bases. Interestingly, the two most famous and successful operations were conducted by heavily armored units: the 3d Armored Cavalry Regiment (3ACR) in Tal Afar; and 1st Brigade, 1st Armored Division in Ramadi.

Tal Afar in early 2005 was dominated by Al Qaeda in Iraq. Local terrorists known as *Takfiri* dominated the city's infrastructure and were using their power both to facilitate entry of foreign fighters to Mosul and to systemically cleanse the minority Turkomen Shiite population from the city. In mid 2005 3ACR's commander, Colonel H.R. McMaster, developed alliances with local leaders to provide intelligence that allowed the city to be methodically cleansed of Al Qaeda dominance. Armored cavalry forces worked in conjunction with Iraqi Army infantry and Iraqi police to establish governmental control, security, and infrastructure. By the time for transition in February 2006, violence was down over 80% and Al Qaeda was largely expelled from the city. 3ACR employed a combination of mounted and dismounted tactics with local support to achieve what has been one of the few lasting successes in Iraq.

1st Brigade, 1st Armored Division under Colonel Sean MacFarland relieved 3ACR in February in Tal Afar and continued the counterinsurgency strategy of local engagement and local presence. The brigade used a combination of mounted and dismounted tactics to secure the city while continuing to develop the nascent infrastructure and security forces. The city responded and was quiet enough that in May all but one battalion of the 1st Brigade was transferred to Ramadi, which at that time was one of the worst areas in Iraq. Skillful employment of three armored, one infantry, and one marine battalion in small company bases located in neighborhoods placed tremendous pressure on the hardcore insurgents. These armor/infantry combined operations, together with a robust local leader engagement plan, set the conditions for the now-famous "Anbar Awakening," a tribal and local alliance that drove the extremists and Al Qaeda out of Ramadi and eventually most of Al Anbar.

KING OF THE KILLING ZONE

Why are armored vehicles desired and surprisingly effective in urban operations? We have discovered that US armored vehicles are not nearly as vulnerable as previously assumed when operated by highly professional soldiers using good tactics. The armor package on the M1 Abrams and M2 Bradleys is resistant to almost all the current light anti-tank missile warheads. These vehicles can withstand multiple RPG and machine gun barrages and remain combat effective. The armored vehicles have proven extremely resistant to IEDs.

Crew casualties are rare when compared to IED strikes on HMMWVs or light vehicles.

Our newest vehicles possess the ability to execute precision machine gun engagements at ranges greater than 1,000 meters while dispersing fires no wider than a trash can. The basic load of small arms ammunition of a single M1 tank exceeds that of an entire light infantry company. Superior optics and night vision provide a tremendous capability for observation and overwatch of routes and secure sites. The M2 Bradley in particular is extremely versatile and can deliver troops rapidly to the mission in a protected fashion. Heavy armored vehicles bring a "presence" to the fight that no other vehicle can match—the arrival of a tank to a conflict often triggers an insurgent withdrawal rather than a willingness to continue the fight. The tank has also proved an effective non-violent tool to control uprisings and crowds—the tank brings a psychological presence that is unmatched by any other vehicle.

The current conflict in Iraq has proven what our fathers and grandfathers learned at great cost in World War II and Vietnam—Armor is relevant and crucial to success in urban and restricted terrain combat when acting as part of a combined arms team. While only one part of the combined arms team, it is one whose relevance and reputation has grown since 2003. One measure of the tank's growing importance in urban operations is the re-start of tank upgrades and development to the M1 series called the Tank Urban Survival Kit (TUSK) which is modifying current M1s to better perform in dense areas with more flexible machine guns, increased situational awareness, and better survivability. As we move towards the Future Brigade Concept Teams and the Future Combat System, we must not forget the need for a platform capable of surviving and winning in close combat urban environments.

The armor package on the M1 Abrams and M2 Bradleys is resistant to almost all the current light anti-tank missile warheads.

Armed Overwatch:

Key to Successful COIN Operations in Urban Terrain

By
Lt Col Clint "Q" Hinote, USAF
Air University
Maxwell AFB, AL

INTRODUCTION:

Each day, as coalition forces execute operations in Iraq and Afghanistan, air platforms offer ground commanders something invaluable. These commanders have an insatiable appetite for assets that can provide full motion video, including those that use advanced targeting pods linked to ground stations via video downlink to the Remote Operations Video Enhanced Receiver (ROVER). Some consider this indispensable. Why? Commanders crave the critical "view from above" because this perspective helps them overcome the fog of war, especially in urban terrain. It increases their effectiveness and saves lives.

This was the case when Lt Col Greg Harbin, USAF, joined a Marine patrol in Fallujah. Insurgents ambushed their group, and a fierce firefight ensued. As the battle unfolded, Lt Col Harbin reached for his ROVER-enabled laptop…

> *As the laptop powered up, another rocket-propelled grenade burst nearby. His ears rang from the force of the explosion. He turned back to the ROVER. The kit worked, linking with the Predator overhead. The plane's camera sent an image of the surrounding area to the laptop's screen.*
>
> *Harbin searched the video and pinpointed the insurgents, about 100 yards away. He yelled for the Marine captain and pointed to the enemy mortar position on the screen.*
>
> *The captain called in a strike. The Predator fired a Hellfire missile at the insurgents, killing them.*
>
> *Harbin and two Marines were injured, one fatally… Harbin and his superiors say the ROVER system saved his life and many of the Marines on the patrol.*[1]

This story has repeated itself countless times in the urban battlefields

of Iraq. The captains and lieutenants know the effect they want from the air assets: situational awareness gained through the overhead perspective while preserving the option to deliver firepower.[2] Our joint force, however, has had difficulty describing this effect in doctrinal terms. This has led to confusion and consternation as joint forces try to communicate with each other and the Services attempt to organize, train, and equip to provide this critical effect.

NOT CLOSE AIR SUPPORT (CAS)

Although ground commanders want the option of employing fires from airborne assets, they are not asking for CAS, per se. CAS is defined as: Air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces.[3]

"The majority of the time NTISR crews communicate directly with ground units... These aircraft can scout ahead of convoys, looking for possible ambush sites or any other threat."

CAS assumes that hostile targets are present. While this is often true in Iraq and Afghanistan, it is more accurate to say that ground forces *have the potential* to come into close contact with enemy forces whenever they operate "outside the wire." In most cases, units operating in urban terrain do not know if they will encounter the enemy, but they do know that they want situational awareness. The requirement for situational awareness is not as essential in open terrain, such as on the plains of Afghanistan, and operations there resemble traditional CAS.

Technically, CAS begins when troops come into contact and the commander decides to request airborne fires. It ends when these fires are no longer necessary. Conversely, the desired effect in question begins when the mission begins—as airborne platforms offer the ground commander situational awareness during active operations—and it ends with mission completion. Another distinction occurs when an airborne platform has a weapon malfunction or goes "Winchester" (i.e., runs out of weapons). In CAS, it is standard practice for the asset to return to base. In urban COIN operations, however, the ground commander often asks the asset to remain on station, as access to the aerial perspective is more important than the ability to employ weapons.

BUT NOT ISR, EITHER

Since CAS does not accurately describe the effect desired by the ground commanders, some have labeled it as a type of ISR, specifically Non-Traditional ISR (NTISR). A US Central Command Air Forces news release, for example, quotes a USAF officer: "The majority of the time NTISR crews communicate directly with ground units.... These aircraft can scout ahead of convoys, looking for possible ambush sites or any other threat."[4] Unfortunately, NTISR is a confusing term, because it means different things to different people.[5] The term describes other activities as well, such as when platforms with sensors not normally used for collection purposes augment traditional ISR collection. The US Air Force uses this meaning throughout its "NTISR Functional Concept."[6] While this document discusses how airborne assets can supplement ISR collection, especially to gain more data to be processed, exploited, and disseminated, it fails to address how commanders enjoy real-time situational awareness through airborne assets, especially in urban terrain. To rise above the confusion, the joint community needs a better term than NTISR, and examining a concept developed by a US Army infantry commander in WWII may be a good place to start.

THE CONCEPT OF OVERWATCH

As he led his battalion across the plains of Europe, Lt Col William DePuy faced a challenge. When his forces maneuvered against an entrenched enemy, they were extremely vulnerable because they could not return accurate fire as they moved. DePuy developed a system where some of his forces would take up a position of observation and cover this movement, providing suppressing fires when necessary. As a division commander after the war, DePuy and his deputy, Hamilton Howze, formalized this technique, and they coined the term "overwatch" to describe it.[7]

Over the years, the Army incorporated overwatch into its doctrine, and commanders have employed the concept extensively to protect their maneuvering forces.[8] The overwatch concept has two fundamental components. First, some part of the

force is moving, and this element is somewhat vulnerable. Second, another portion of the force is available that can (1) observe the situation from a defensible position, and (2) provide supporting fires if necessary. While use of the overwatch technique can slow the tempo of the ground advance, it has proven to be an effective force protection measure.[9]

Interestingly, while the overwatch concept is sound doctrine, it has a major shortcoming in urban terrain. Ground commanders find that it is often difficult for their overwatching forces to find a suitable position of observation, with access to open fields of fire, when the terrain is dominated by complex manmade physical structures.

ADDING A THIRD DIMENSION

Given this description, "overwatch" is a better term than CAS or NTISR to describe the effect ground commanders need from airborne platforms during their combat operations. These commanders want to use airborne assets in the same way that DePuy used his overwatch force—to take up a position of observation, help build situational awareness, and be prepared to employ fires if necessary. In fact, overwatch in three dimensions seems to be an improvement over traditional two-dimensional overwatch. Airborne assets can accomplish overwatch without slowing down the tempo of the ground operation. Furthermore, overwatch in urban terrain is more effective when airborne platforms assume the observation role, as the airborne perspective allows the ground commander to see behind walls and around corners.

In addition to the advantages airborne platforms enjoy in the observation role, many airborne platforms carry precision weapons that are viable in the urban environment. Although "overwatch" implies the ability to provide protective fires, it is probably best to use "armed overwatch" when referring to airborne platforms in order to differentiate platforms that carry precision ordnance from those that do not. For this reason, "armed overwatch" is the term used by US Central Command Air Forces today.

IMPROVING INTERDEPENDENCE

Adopting the term "armed overwatch" is important for joint communication, but this argument is about more than semantics. The concept of "armed overwatch" can actually teach us something important about joint warfare. Specifically, it helps us understand the teamwork required between ground and air forces for success in urban operations. To DePuy, the overwatching force was an integral part of the team. It had to be of "one mind" in order to be effective.[10] In ongoing operations today, we see that armed overwatch is much more successful when airborne operators—including fixed-wing and rotary-wing pilots, weapons-system operators, and UAS operating teams—are intimately familiar with the ground scheme of maneuver. Air forces cannot just show up and expect to contribute, nor can ground forces expect great teamwork when they keep plans to themselves. A true team effort requires advance preparation by all involved to integrate air and ground power in COIN activities such as raids and cordon and search operations. The armed overwatch concept exemplifies the level of teamwork that we must achieve.

The overwatch concept has two fundamental components. First, some part of the force is moving, and this element is somewhat vulnerable. Second, another portion of the force is available that can (1) observe the situation from a defensible position, and (2) provide supporting fires if necessary.

END NOTE

[1] Julian E. Barnes, '"Rover' Saves Lives on Battlefield," *Los Angeles Times*, 24 September 2007.

[2] Assertions concerning the ground commanders' desires are derived from numerous debriefs with Joint Tactical Air Controllers (JTACs) on their way home from duty in Afghanistan and Iraq.

[3] Joint Publication 3-0, *Joint Operations*, 17 September 2006, GL-9.

[4] Staff Sergeant Melissa Koskovich, "Targeting Pods Enhance Battlefield Awareness," *USCENTAF Public Affairs*, 29 March 2006.

[5] As an example, see the September 2007 ALSA Bulletin on NTISR, where three authors used the term in different ways. The first article, "An Airman's View of NTISR," clearly refers to NTISR as a way to augment existing ISR capability—this approach is consistent with the view of the USAF intelligence community and is explained in the NTISR Functional Concept. The second article, "NTISR in Division TACP Operations," completely changes gears by using NTISR to describe how airborne assets provide real-time situational awareness to ground commanders—the effect that is the subject of this article. The third article, "Sensor-Packaging:

Making the Most of NTISR," returns to the concept that NTISR is a way to fill "collection gaps" by augmenting traditional ISR platforms. This lack of consistency makes the term "NTISR" confusing when joint forces try to communicate with each other.

[6] US Air Force Functional Concept, *Non-Traditional Intelligence, Surveillance, and Reconnaissance*, 15 September 2007.

[7] Major Anthony J. Tata, "Sustaining the Tempo: A New Method of Overwatch," (unpublished monograph: School of Advanced Military Studies, Fort Leavenworth, Kansas, 4 February 1993), 7-8.

[8] Army doctrine actually details two variations of overwatch: *traveling overwatch*, where a trailing element provides the overwatching function, and *bounding overwatch*, where the overwatching element actually takes up a stationary position of observation. US Army Field Manual 3-90, *Tactics*, July 2001, 14-9 to 14-12.

[9] Tata, "Sustaining the Tempo," 8-9.

[10] Colonel William E. DePuy, "11 Men, 1 Mind," *Army* 8, no. 8 (March 1958): 22-24, 54-60. *Reprinted in Selected Papers of General William E. DePuy*, Compiled by Colonel Richard M. Swain (Fort Leavenworth, Kansas: US Army Command and General Staff College, 1994), 17-24.

Benefits and Challenges of Integrated Live Fire in MOUT Training Joint Multinational Readiness Center (JMRC)

A-10 provides CAS during MOUT training at JMRC training area Hohenfels, Germany (Photo courtesy of Lt Col John Scotto, USAF)

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The global war on terror (GWOT) has caused many of us involved in preparing joint forces for deployment to examine our long held beliefs about the value of various kinds of training. In the not too distant past, it was taken by many as axiomatic that military operations in urban terrain (MOUT) were, at best, a sideshow to "real war". However, GWOT has demonstrated that, at least in the current phase of this war, MOUT is the pre-eminent method of warfare and joint training has shifted to accommodate this reality. In addition, the particularly brutal, unpredictable, and often up-close nature of the current fight has also given rise to a desire for increased live-fire MOUT training in order to provide a more realistic training environment. However, more realism whatever its advantages, comes at a price in terms of limiting regulatory flexibility and creating additional risk. Based upon my own experience as the senior USAF observer/controller (O/C) at the Joint Multinational Readiness Center (JMRC) in Hohenfels, Germany, I would like to propose some food for thought on the merit versus risk of CAS live fire in MOUT training.

In principle, the argument that more realistic training is better for our Soldiers and Airmen seems reasonable. However, as with most principles the devil is in the details. In order to illustrate this I will lay out a summary of what JMRC has done to promote live fire integration into MOUT training. JMRC has actively encouraged and now regularly includes live-fire, both as

traditionally conceived (small arms training, tank gunnery tables, etc.) and with specialized training rounds (frangible marking rounds with a little extra kick). The thought process has been that, while MILES (laser activated hit/kill sensors) gear is good, Soldiers simply react differently to a painful reminder (a welt) from a training round than to a beep from a MILES kill. Ultimately, this different reaction is presumed to translate into better combat survivability. Similarly, Army AH-64s have integrated 30mm live-fire in close proximity to several of the MOUT villages at Hohenfels while ground maneuver units were in the villages. The psychological impact of seeing and hearing attack helicopters firing adds a hard to quantify, but perceptible, "edge" to the training experience.

AH-64 live fire during JMRC MOUT training, US Army

Based upon these live-fire experiences, the JMRC and OL-A worked together to create a CAS live-fire proof-of-principle (PoP). The primary goal was to demonstrate the possibility and utility of further enhancing the "edge" using CAS. In October 2006, OL-A, working with USAFE and ACC assistance and coordination, was able to execute a very limited scale CAS PoP exercise at Hohenfels. During a non-rotational period, A-10s firing 30mm TP and dropping BDU-33s were able to execute a series of joint terminal attack controller (JTAC) directed attacks on targets in relatively close proximity (distances varied based upon Safe Range weapon/delivery footprints) to JMRC MOUT villages in the approximate center of the Hohenfels Training Area (HTA). These targets also had the advantage of being relatively unrestricted with respect to run-in heading and had been chosen for just such a training advantage.

Thus, the JTACs actually had to determine the desired (and appropriate) final attack headings (FAH) rather than simply parrot what a range regulation had already pre-determined as happens at many live-fire ranges. I was told by the 2 ASOS JTACs who participated, that it was the first time—outside of combat—they had to actually make real decisions about FAH based upon the tactical scenario, weather, weapon trajectory, etc. The JTACs had to not only think about the considerations outlined in Joint Publication (JP) 3-09.3 and ALSA's, *JFIRE*, MTTP publication but got to see them play out before them—under the watchful eye of a senior TAC-I.

While successful in terms of safety and efficiency, the PoP was not an unmitigated good news story. The basic problem was Air Force Instruction (AFI) 11-214, *Air Operations Rules and Procedures*, Attachment 6, "Minimum Safe Distances for Ground Parties," which allows the JTAC to be relatively close to the weapons impact area (in this case 500m exclusive of strafe ricochet fans). We could not in similar fashion put Army personnel, such as small unit leaders, forward observers, fire support officers, and small maneuver units (platoons, companies) at those same distances. This became a source of frustration for Army leaders who made remarks along the lines of "Playing it too safe here in training will costs lives downrange when a Soldier sees CAS for the first time as he also faces enemy fire for the first time." (This remark was made by a very senior Army leader in a non-attributional forum). This sentiment seemed representative of many of the senior Army trainers and operational commanders as we discussed the PoP.

JTACs actually had to determine the desired (and appropriate) final attack headings (FAH)

It certainly makes sense that Army commanders would wish for Army leaders at all levels, but especially junior leaders, to experience the full spectrum of US military force that can be brought to bear before having to use it in combat for the first time. However, AFI 11-214, Attachment 4, "Air-Ground Joint Live Fire Procedures," provides USAF guidance for joint live-fire and clearly restricts non-TACP or maneuver unit personnel from using the reduced ranges of Attachment 6. The driving issue is

obviously safety and the inability to know with certainty the location of all the members of a maneuver unit so as to be able to bring them—with confidence—into the ranges provided for in Attachment 6. Having spent many rotations at JMRC observing training units, I am convinced that Army maneuver units as currently outfitted for training cannot maintain high enough fidelity on the position of all individuals in a particular unit to allow the use of the reduced ranges allowed for TACP/JTAC personnel—at least not in a tactical environment with units reacting to contact with the enemy. While some Army leadership might simply accept risk in this regard, the ordnance droppers and USAF officials would also have to be willing to accept that same risk in training.

Just as there is risk of injury in allowing more realistic training there is also operational risk in not allowing Soldiers and Airmen to be as fully trained as possible before entering combat.

So, if the training gain appears to be real, but the training risk also appears real how can we move forward in a way beneficial to all parties, mindful of all legitimate concerns? I propose that by increasing the training audience allowed in AFI 11-214, Attachments 4 and 6, to include key leaders and battle staff personnel, such as joint fires observers (JFOs), forward observers, fire support personnel, and commanders, a training gain could be achieved for the highest-payoff targets while still keeping the audience small enough to ensure personnel accountability never becomes a show-stopper. This would also have the effect of allowing some of the execution coordination that must occur to take place between TACP and Army key staff. The downside would be that the Army staff personnel would have to be in a somewhat artificial environment (i.e., sans most of their troops). However, on balance it does seem the easiest path to a reasonable compromise. In short, a minor regulatory change could help achieve the lion's share of the training gain desired while only slightly increasing the risk.

Stryker unit at JMRC MOUT site, US Army photo

Risk is the military's business and one must manage it all the time. However, risk cannot simply be thought of in a rigid manner. Just as there is risk of injury in allowing more realistic training there is also operational risk in not allowing Soldiers and Airmen to be as fully trained as possible before entering combat. Based on the nature of the current phase of GWOT, the old ways of integrating fixed wing live-fire—at a far distance from Army leaders, essentially acting like interdiction even if we called it CAS— does not address the challenge of training like we fight. With some forethought and a relatively simple change of regulations we can go a long way toward re-directing our training and capturing the "edge" where it is most needed.

New MOUT Tactics: Mirror-based Sighting Devices for Small Arms

Soldier traning with Mirror Style shoot-around-the-corner sight (Photo courtesy of GySgt Falcon, USMC (res))

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Dominating urban terrain remains one of the primary challenges of MOUT. Soldiers must not be handicapped by urban surroundings. Accomplishing this goal provides both offensive and defensive benefits. Consequently, the last several years have seen significant interest in the development of weapon sighting systems which can allow Soldiers to return well-aimed lethal fire from a protected position. In today's urban combat environment, using these new tools to fight "outside the box" can result in significant advantages, especially since the enemy cannot presently match or counter these fighting techniques.

A question which must be addressed in evaluating these new sighting systems is whether cost in procurement and training time produces a significant benefit in terms of lethality and Soldier survivability during intense urban fire-fights. If the advantage provided is only slight, then it is clearly better to focus resources on more productive equipment and training. On the other hand, if the benefit provided by such sighting systems allows Soldiers to dominate the urban fire-fight, then it is clearly worth the investment.

The cost-benefit analysis of whether a piece of equipment and a training system is "worth it" is a five-part question: 1) how much lethality does it add, 2) how many casualties will it prevent, 3) what is the cost in money and training effort, 4) does it cause any problems in weapon functionality, 5) will it cause injury to Soldiers? I feel item 2 is the most important.

In assessing the value of avoiding casualties, it is important to keep in mind that in addition to the obvious reasons for avoiding casualties, there is a chain reaction effect which occurs during a fight when one member of the team is wounded. The result can be that a highly mobile team can suddenly be brought to a standstill by the need to

One of the primary challenges of MOUT is how to use the urban surroundings so that the physical environment becomes an advantage rather than a handicap to our Soldiers.

protect, treat, and evacuate a wounded Soldier. The dynamics of the fight can instantly change from one of domination to one of defense. Especially when, in the MOUT environment, it may only be a matter of minutes before a swarm of enemy combatant reinforcements arrive on the scene. If a piece of equipment and a system of training can help avoid this potentially disastrous outcome, then it certainly has value.

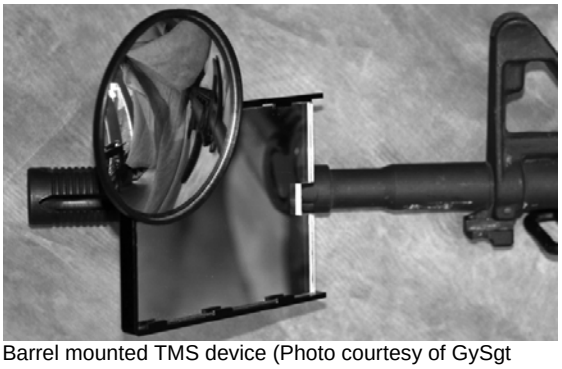
The two main types of shoot-around-corner sighting systems are the high-tech systems which integrate a video camera with a weapon, and the low-tech systems which integrate a mirror device with the weapon's red dot sighting system. The purpose of this article is to examine the latter of these two alternatives, and more specifically, to evaluate Tactical Mirror Sight/back up iron sight (TMS/BUIS) system benefits.

The two main types of shoot-around-corner sighting systems are the high-tech systems which integrate a video camera with a weapon, and the low-tech systems which integrate a mirror device with the weapon's red dot sighting system.

The questions to ask specifically about mirror-based sighting systems are: 1) whether they are sufficiently user-friendly and can truly function in the role they are designed to serve, 2) whether they are sufficiently compact, lightweight, and quick to deploy or stow so they are not detrimental to the overall usability of the weapon, 3) whether they are durable enough to take the abuse they are going to suffer, and 4) all things considered, can they really play a role in a highly dynamic combat situation in which rapid and agile movement is critical to mission success.

Many individuals have an initial bias against mirror sighting devices because they do not allow for the same speed of movement or the same speed of target acquisition as is provided by conventional aiming. However, the reality of MOUT is that situations are going to be encountered in which our troops are taking on fire so heavy that they cannot move freely or aim accurately in a conventional manner. In this situation of heavy incoming fire a mirror aiming device really finds its niche. In that situation, the enemy already knows your general position, and there is nothing that telegraphs your exact position to the enemy better than continually popping your head out from around a corner. In the visually complex scenario of a firefight, a stationary weapon is a far less obvious target than the moving head and shoulders of a Soldier.

If suppressive fire is available from other members of the team, then this obviously advances the usefulness of the mirror aiming device. If a team member is not available, then you lay down your own suppressive fire as you move your weapon around the corner to take aim through the mirror device. The user can then watch for enemy movement and take a center-of-mass shot at the enemy rather than simply burning ammunition by "spray and pray." By allowing the Soldier to remain protected behind cover while aiming, the Soldier is allowed the time to take a reasonably well aimed shot even in a heavy firefight. The bottom line is that even though mirror aiming devices are slower than conventional aiming, once a team is taking enemy fire and their position is clearly known to the enemy, a mirror-sighting system will provide significant survivability and lethality to the user.



Barrel mounted TMS device (Photo courtesy of GySgt Falcon, USMC (res))

When the "TMS" was developed, the engineering challenge was to occupy only a very small amount of space on the rail of the weapon while providing both a BUIS and shoot-around-corners capability, as well as be able to deploy or stow either device in one second or less. This was a very challenging engineering goal, but the device actually does it. The main issue with other mirror sighting devices is that they occupy the space on the rail which is currently occupied by your BUIS. The problem is how to get instant accessibility to both a mirror sight and a BUIS without having to get one of them out of the way so the other one can do its job. The TMS is a very innovative solution to this problem. It is a dual purpose device which provides both the ability to aim and shoot accurately around corners, as well as

alternatively serving as a fully adjustable BUIS in the event of failure of the weapon's red dot optic. When the device is not in use for aiming, it is stowed in a flipped-down position just like any other BUIS (by simply rotating it and slapping it down against the rail). When it is needed for aiming, it is simply flipped up and rotated to either a left-hand or right-hand detent stop position. This is the specific advantage of the TMS over other similar devices—either the mirror or the BUIS can be instantly deployed if you need them and then instantly stowed if you don't (without removing or replacing either one during a fight).

The most difficult part of the decision-making process concerning whether mirror sighting devices should be used or not pertains to whether Soldiers can acquire an adequate skill level within a reasonable amount of training. The advantages of the TMS over other around-corner sighting systems arise from its compactness and dual functionality. Once the TMS is mounted on the rail, it is generally left in place like any other BUIS. Flipping it up or down between the in-use position and the stowed position takes one second, which makes it practical to use in the rapidly changing dynamics of a firefight. Likewise, popping it up into its BUIS position (and locking it into that position) takes only a second. No other mirror sighting system allows for leaving a fully adjustable BUIS on the weapon while using the mirror sight device. The BUIS which is built into the TMS is a dual aperture sight, which is adjustable for both windage and elevation. The TMS requires about 2 inches of rail space on a mil standard 1913 Picatinny rail (such as on an M4) behind an unmagnified red dot optic, such as an Aimpoint M68 CCO, an EOTech sight, or an unmagnified Trijicon reflex sight.

The TMS's compactness sets it apart from other similar devices and allows it to sufficient space to retain BUIS functionality as part of its design. The trade-off for this compactness and dual functionality as a BUIS is that the device provides a mirror image of the target. My personal experience with this device has been that the reverse imaging is easily mastered with some dry-fire training. The user simply tracks the visual image presented in the mirror in order to make left to right or up and down aiming adjustments. Center-of-mass shots are very attainable with a reasonable amount of practice. It should not be surprising that this device, just like most of the equipment we use, requires some practice and training.

The training program that is most effective is to begin by drilling repetitively on moving from a muzzle-down position to a muzzle-up and eye-on-the-red-dot position (while looking through the mirror at the red dot). Each time the weapon is brought up, the stock should be pulled in tight against the Soldier's outer upper arm in order to provide aiming stability. This is the most important step which is usually missed by Soldiers who are first learning to use the device. Failing to pull the stock of the weapon in tight against the upper arm is like failing to use a cheek weld position when aiming conventionally. Soldiers should train on this red-dot-acquisition drill until they can reliably bring the weapon into the shooting position with their eyes closed and have it in the correct position for seeing the red dot of their scope when they then open their eyes. This is purely a function of practice and muscle memory. Once they can do this, they should practice dry-fire target acquisition, again paying close attention to pulling the stock of the weapon in tight against their outer upper arm each time the weapon is raised and aimed.

The training program which is most effective is to begin by drilling repetitively on moving from a muzzle-down position to a muzzle-up and eye-on-the-red-dot position.

The TMS comes with a larger mirror which can be snapped over the smaller main mirror. Most Soldiers find it is helpful to use the larger snap-on mirror when they are first learning to aim and shoot with a TMS. The larger mirror affords the user a much wider field of view, which makes target acquisition quicker and easier. This larger mirror is also useful for shooting over high walls that are too high to look directly over. It is also useful for some building clearing operations or for entering and clearing buildings where there is a known active shooter.

A second part of the TMS system is the barrel-mounted mirror for looking (not aiming) around corners or stairwells, over walls or into attics, or inspecting under vehicles. A spring steel

mounting bracket (1.5"x1.5"x2") is clipped onto the barrel of the rifle just behind the flash suppressor. The same large mirror as described above can then be snapped onto the barrel-mounted bracket, thus providing the user with a hands-free mirror-on-a-stick. Additionally, a convex wide-angle mirror can be clipped on (as shown in the photo) for under-vehicle inspection. Typically the bracket and mirror will be positioned at a 6 o'clock position under the barrel of the weapon. The weapon can then be rotated onto its side to the left or right for looking either direction as the Soldier moves toward left or right corners. An important feature of the barrel-mounted mirror is that it is designed specifically to angle the mirror in such a way that if the user visually locates an enemy threat in the mirror, the user can easily calculate the exact physical position of the enemy by running an imaginary line at an exact 90 degree angle to the barrel of the user's weapon.

This barrel-mounted mirror is the only way weapon-mounted night vision devices can be used to look around a corner.

TMS adjustable mount (Photo courtesy of GySgt Falcon, USMC (res))

For use with weapon-mounted night vision devices, the mirror bracket can be rotated to a 12 o'clock position on the barrel, allowing the soldier to rotate his weapon onto its side to look through his night vision device and then through the mirror to see around a corner or other barrier. This barrel-mounted mirror is the only way weapon-mounted NODS can be used to look around a corner without exposing the user's head and shoulder to enemy fire.

A brief note is in order regarding the safety of using any of these types of aiming devices especially while shooting around a corner in a more or less "left handed" position. Several of these sighting devices allow or even encourage the user to fire the weapon with their face directly in front of the shell ejection port of the weapon. This exposes the user to eye injuries from ejected shells. The TMS is designed so that the user cannot see through the mirror to aim unless their face is positioned outside of the path of ejected shell casings. When you are evaluating any of the aim-from-behind-cover devices, it is essential to evaluate this critical safety factor.

We owe it to ourselves and our troops to think outside the box in search of new tactics which can be used to dominate the enemy in the MOUT environment. Since the weapons used by most enemy forces are not suited to the use of mirror sighting systems (because of the lack of rails and red dot sights on their weapons), our adoption of this equipment and these tactics will provide a considerable advantage to our troops in urban combat.

Battlefield Innovation and Brave Leadership: Retaining Control of the Night

AH-64 flying missions over Baghdad (U.S. Army photo by CW4 Daniel McClinton, 1st Air Cavalry Brigade)

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"The Services and combatant commands must allow our highly trained and skilled professionals the opportunity to create new concepts and ideas that may lead to future breakthroughs."

—Joint Vision 2020

COURAGE TO INNOVATE

War has often caused the Soldier on the front line to accelerate the rate of change faster than industry and "the system" could keep up. A recent example would be the up-armored HMMWV. Today we wouldn't dream of sending Soldiers out the gate in an unarmored vehicle but a short time ago the mere idea of welding salvaged Iraqi steel onto the sides of our soft-top HMMWV would have been considered heretical foolishness. Think of the courage required by that first commander to approve this "unauthorized" modification. There were plenty of reasons not to move forward—certainly the vehicle suspension, transmission, and brakes were not stressed for the added weight and the change in center of gravity would make these vehicles more susceptible to rollover. Those not in the war zone would have said "Where's your test plan?" "Where's your data?" "Who authorized you to do this?" Yet making that gutsy "unauthorized" modification probably saved thousands of Soldiers from being maimed while it significantly increased our combat effectiveness. Another example of bold innovation led us to ANVIS night vision goggles (NVGs) that we take for granted today. It all started when the "Full Face" PVS-5 NVGs were "cut away." It certainly took great courage for that first commander to approve taking a hacksaw to the most expensive end-item on his property book! Now it is time again to step up to the next innovation challenge. There is a simple, cost effective way to make our aircrews safer and more combat effective; all it takes is the courage to innovate.

THE NEXT STEP:
NIGHT VISION MONOCULAR (NVM) FOR AIRCREW

Photo courtesy of CW5 Aylworth, USA

Today's battle still demands combat innovation. The modifications described in this article represent a simple, totally reversible, nondestructive, zero-cost, modification to our presently fielded NVGs that will enhance your unit's combat effectiveness, aircrew safety, and help prevent fratricide. This is not a future capability or a "some-day" option but something that your unit can execute tonight; all it takes is the courage to innovate.

THE GAP IN OUR CAPABILITIES

Today our crews have to execute several tasks simultaneously, all of which are critical to both their own safety and the safety of our troops on the ground. Night counterinsurgency requires the crews to simultaneously:

- See infrared (IR) position and strobe lights of other aircraft traffic for flight safety.
- See IR strobe lights, IR lasers, and IR glint tape of ground troops and vehicles to avoid fratricide.
- See TADS/MMS weapons cockpit video to engage the enemy.
- See pilot night vision system (PNVS) flight and weapons video and symbology for flight safety and to engage the enemy.
- See the multipurpose/ multifunction cockpit displays to access critical friendly and enemy situational awareness data.

NVD MONOCLE ALTERNATIVE

How can our crews see all of these visual inputs all at once? Well, one good answer is a monocular night vision device (NVD). Apache pilots have been flying with forward looking infrared (FLIR)-based monocular Helmet Display Units (HDU) for more than 20 years and have learned that there are several advantages to a monocular NVD. A monocular system has unique safety and operational advantages.

MONOCLE SAFETY ADVANTAGES

Most of the weight in an NVG is the tubes—cut the number of tubes in half and you nearly cut the weight of the NVG in half. A reduction in helmet-borne weight is critical to enhanced crash survivability. Additionally, a low on-helmet weight is a significant factor in maintaining crew endurance during long night combat missions. A less well recognized, but very significant, safety and tactical advantage of a monocular system is the ability to provide an unobstructed view of both the outside world and inside the cockpit.

IMPORTANCE OF UNOBSTRUCTED UNAIDED VISION OUTSIDE THE COCKPIT

The Los Angeles Police Department (LAPD) has the most well resourced law enforcement air unit in the world. If LAPD wants it—they get it. Yet LAPD chose not to fly NVGs—not because they can't afford it—but because over a well lit city such as Los Angeles [or Baghdad] their aircrews are more effective without NVGs than with them. Even the latest NVGs are affected by bright lights which make it more difficult to look past the light posts onto the street or parking lot below. Since NVGs (and PNVS) are "unity mag" and have lower resolution (20/40), when given enough ambient light you can often see more and better with unaided vision than through NVGs. Though NVGs remain indispensable, operationally the benefits of peripheral and color vision are significant both from a tactical and flight safety perspective. On military aircraft we need to quickly see and differentiate among various overt and covert lights and switch effortlessly between aided and unaided vision. The system that would allow us to do both would be an NVM.

BREAKING OUT COLORED LIGHTS AND FLIGHT SAFETY

Even in a war zone, the risk of mid-air collision in an area of high traffic (such as near major airports) demands employment of visible (overt) anti-collision and navigation position aircraft lighting. Breaking out a red position light from the cluttered background of lights around the forward operating base can be critical to flight safety. This is not possible given the monochromatic nature of NVGs; however, an NVM would allow the use of color vision by providing an unobstructed view of the outside world.

BREAKING OUT IR LIGHTS AND FRATRICIDE PREVENTION

For fratricide prevention all friendly forces mark their own location with near infrared signals such as IR-strobes, IR-chemsticks, and IR-lasers. Of course, all of these are only visible under NVG and are completely invisible to the Apache TADS or PNVS. When responding to troops in contact or attempting a link up with ground forces, the crew will see the lights from some distance away but are these good guys or are they bad guys? The flashing lights seen in the goggles might be friendly IR strobe lights, Iraqi police blue lights, harmless civilian flashing lights, or enemy visible light signals. As all lights look the same under NVG, comparing that goggle light source with unaided color vision is the only way to be sure. To determine if these are the IR lights of the good guys, you normally displace your NVGs and see if you can still see the lights with unaided vision. Doing so at 110kts over complex terrain, while retaining the target area in sight, can be problematic. Keeping the light source in the field of view of the goggles while still looking at the lights with your unaided eye eliminates this problem. In contrast, the 4-tube Panoramic NVG, and the Sight Display Unit (SDU) with conventional NVGs, significantly obstruct the pilot's unaided "out the window" view.

IMPORTANCE OF UNOBSTRUCTED UNAIDED VISION INSIDE THE COCKPIT

The complexity of the modern battlefield demands the utmost in situational awareness (SA). Modern cockpit displays greatly enhance SA, however, all the SA cockpit tools in the world can't help if you can't see them. As we transition the force to all glass cockpits the importance of seeing the moving map displays, Blue Force-Tracker, "dig-com" team member icons, and soon, unmanned aerial system (UAS) streaming video, this will continue to drive the requirement for an unobstructed view of the cockpit. Presently, the standard 2-tube NVG restricts the pilot's view of the cockpit. This condition is even worse with the more obstructive systems such as the 4-tube Panoramic NVG and the Apache SDU. Both these systems significantly obstruct the view of these critical cockpit SA tools. The alternative is not more tubes but less. NVMs would allow an unobstructed cockpit view.

HOW IS IT DONE?

Okay, got it. For all these important reasons we need a single tube NVG, but how do we get one? Simple—during routine NVG maintenance your AVIM "Goggle Shop" removes the individual NVG tubes from the ANVIS Pivot Adjust Shelf when the ANVIS is pulled for inspection, testing, repair, and replacement as required. The NVG will function normally with a single goggle tube. This totally reversible, non-destructive, no-cost change in procedures effectively doubles the number of goggle tubes available to a unit, something particularly useful when new, better, tubes are fielded.

WHAT ABOUT THE SDU?

The SDU replaces the Apache's PNVS/TADS-HDU. The SDU beams HMD flight symbology into an NVG tube. It is designed to only display HMD flight symbology. When the CPG sets his sight select to TADS or NVS he'll get a distorted FLIR image beamed into his right NVG. To work, the SDU requires the disconnection of the Apache's HDU and a complete recalibration of the aircraft's Display Adjust Panel (DAP). This procedure is normally done on the ground with the canopy door open and a jeweler's screwdriver in hand. It is impossible to perform a swap of the HDU/SDU in flight while strapped into the seat and wearing body armor. This represents the greatest disadvantage of the SDU; it is an all or nothing solution. The Apache pilot must commit to only flying the SDU for the duration of the entire mission. Consequently, prohibiting first or last light missions as

The flashing lights seen in the goggles might be friendly IR strobe lights, Iraqi police blue lights, harmless civilian flashing lights, or enemy visible light signals. As all lights look the same under NVG, comparing that goggle light source with unaided color vision is the only way to be sure.

the pilot's daylight capable weapons sight (HDU) is rendered inoperative. Moreover, from a flight safety perspective, locking the Apache pilot into the SDU/NVGs means that he cannot utilize the PNVS's unobstructed view forward and down during dust landings—a big deal when you don't have a chin bubble. Lastly, the SDU substantially obscures both the pilot's view of the multipurpose displays (MPDs) inside the cockpit and his unaided vision outside the cockpit.

WHAT ABOUT MTADS?

The NVM is always there and ready, whether during FLIR cool-down during a QRF scramble, MTADS, SANUC, or during a post shoot-down evasion scenario.

The Modernized Target Acquisition and Display Sight System (MTADS) is a great and long over due improvement to the Apache family. MTADS is made even better when paired with an NVM. The challenge for the Apache crew has always been how a CPG can be both a copilot and a gunner at the same time. When the MTADS is in zoom FOV locked onto a target 8 km away, the front-seater can only be a gunner for the duration of the engagement, unless he has access to another night sensor at the same time. The NVM will finally allow the CPG to fill both jobs in his title simultaneously. Moreover a small NVM can fit in the survival vest and would always be with the aviator and always available when needed. MTADS can't help if aircraft power is lost or if it's damaged by ground fire. The NVM is always there and ready, whether during FLIR cool-down during a QRF scramble, MTADS, SANUC, or during a post shoot-down evasion scenario.

WHAT ABOUT TESTING?

Peace Time Testing. In the 1999, Fort Rucker conducted limited testing of a PVS-14 (ground NVG) monocular. Resource constraints limited testing to a very small sample size (only two AH-64A pilots and two UH-60 pilots) with very limited flying hours. Frankly, back then the results were mixed; there were things about the monocular that the subjects liked and things that they didn't. However, back then, the focus was on night flying not fighting. Night flying an AH-64A around Ft. Rucker in 1999 is different than night fighting an AH-64D over Baghdad today. The realities of flying in the war zone significantly tip the balance in favor of a monocular NVG.

Wartime Use. The author has flown the single ANVIS tube/ FLIR HDU combination for hundreds of hours. He has flown this system in all light levels and environments ranging from over-water, over-desert, and in the mountains, as well as combat missions over the palm groves of Mesopotamia, and the crowded night skies over Baghdad. Others who have flown this system in combat have liked it. For the Apache pilot, an advantage of the two monocular displays is that the pilot can easily flip up or down the sensor that is optimum for the conditions and can readily clear one eye for an unobstructed view inside or out. In some conditions (like over water and over desert) the FLIR and NVG can be flown simultaneously. Some have called flying both systems together **"GLIR,"** [Night Vision] **G**oggles [and Forward] **L**ooking **I**nfra **R**ed. In these cases your brain overprints light sources seen in the NVG over the baseline FLIR image giving a sensor fusion-like effect (phenomenon also found during the Ft. Rucker tests, see USAARL Report No. 98-38). In actual wartime use, the NVM has proven to be combat effective—what else could we ask for?

Our enemy is often said to be clever and adaptive; it's time we forced them to say the same about us. The NVM, single tube ANVIS, is cheaper, lighter, safer, more tactically useful, and available now. All it takes is the willingness to embrace our presently written doctrine by having the courage to innovate—then your unit could be flying them tonight!

"The US Armed Forces will continue to rely on a capacity for intellectual and technical innovation"…"Innovation, in its simplest form, is the combination of new "things" with new "ways" to carry out tasks. In reality, it may result from fielding completely new things or the imaginative recombination of old things in new ways"…

—Joint Vision 2020

CURRENT ALSA MTTP PUBLICATIONS

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TITLE	DATE	PUB #	DESCRIPTION / STATUS
ADUS *Multi-Service Tactics, Techniques, and Procedures for Air Defense of the United States* **Classified SECRET/ REL CAN**	22 MAR 04	FM 3-01.1 NTTP 3-26.1.1 AFTTP(I) 3-2.50	Description: Supports planners, warfighters, and interagency personnel participating in air defense of the US by providing planning, coordination, and execution information. Pub is primarily focused at the tactical level. Status: **Assessment**
AVIATION URBAN OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Aviation Urban Operations* **Distribution Restricted**	9 JUL 05	FM 3-06.1 MCRP 3-35.3A NTTP 3-01.04 AFTTP(I) 3-2.29	Description: Provides MTTP for tactical-level planning and execution of fixed- and rotary-wing aviation urban operations. Status: **Current**
JFIRE *Multi-Service Procedures for the Joint Application of Firepower* **Distribution Restricted**	17 DEC 07	FM 3-09.32 MCRP 3-16.6A NTTP 3-09.2 AFTTP(I) 3-2.6	Description: Pocket size guide of procedures for calls for fire, CAS, and naval gunfire. Provides tactics for joint operations between attack helicopters and fixed-wing aircraft performing integrated battlefield operations. Status: **Current**
JSEAD / ARM-J *Multi-Service Tactics, Techniques, and Procedures for the Suppression of Enemy Air Defenses in a Joint Environment* **Classified SECRET**	28 MAY 04	FM 3-01.4 MCRP 3-22.2A NTTP 3-01.42 AFTTP(I) 3-2.28	Description: Contributes to Service interoperability by providing the JTF and subordinate commanders, their staffs, and SEAD operators a single, consolidated reference. Status: **Assessment**
JSTARS *Multi-Service Tactics, Techniques, and Procedures for the Joint Surveillance Target Attack Radar System* **Distribution Restricted**	16 NOV 06	FM 3-55.6 MCRP 2-1E NTTP 3-55.13 AFTTP(I) 3-2.2	Description: Provides procedures for the employment of JSTARS in dedicated support to the JFC. Describes multi-Service TTP for consideration and use during planning and employment of JSTARS. Status: **Current**
KILL BOX *Multi-Service Tactics, Techniques, and Procedures for Kill Box Employment* **Distribution Restricted**	13 JUN 05	FM 3-09.34 MCRP 3-25H NTTP 3-09.2.1 AFTTP(I) 3-2.59	Description: Assists the Services and JFCs in developing, establishing, and executing Kill Box procedures to allow rapid target engagement. Describes timely, effective multi-Service solutions to FSCMs, ACMs, and maneuver control measures with respect to Kill Box operations. Status: **Assessment**
SURVIVAL, EVASION, AND RECOVERY *Multi-Service Procedures for Survival, Evasion, and Recovery* **Distribution Restricted**	20 MAR 07	FM 3-50.3 NTTP 3-50.3 AFTTP(I) 3-2.26	Description: Provides a weather-proof, pocket-sized, quick reference guide of basic survival information to assist Service members in a survival situation regardless of geographic location. Status: **Current**
TAGS *Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System* **Distribution Restricted/ REL ABCA**	10 APR 07	FM 3-52.2 NTTP 3-56.2 AFTTP(I) 3-2.17	Description: Promotes inter-Service awareness regarding the role of airpower in support of the JFC's campaign plan, increases understanding of the air-ground system, and provides planning considerations for the conduct of air-ground ops. Status: **Current**
TST *Multi-Service Tactics, Techniques, and Procedures for Targeting Time-Sensitive Targets* **Distribution Restricted**	20 APR 04	FM 3-60.1 MCRP 3-16D NTTP 3-60.1 AFTTP(I) 3-2.3	Description: Provides the JFC, the operational staff, and components MTTP to coordinate, de-conflict, synchronize, and prosecute TSTs within any AOR. Includes lessons learned, multinational and other government agency considerations. Status: **Assessment**

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TITLE	DATE	PUB #	DESCRIPTION / STATUS
UAS *Multi-Service Tactics, Techniques, and Procedures for Tactical Employment of Unmanned Aircraft Systems* **Distribution Restricted**	3 AUG 06	FM 3-04.15 NTTP 3-55.14 AFTTP (I) 3-2.64	Description: Establishes MTTP for UAS addressing tactical and operational considerations, system capabilities, payloads, mission planning, logistics, and most importantly, multi-Service execution. Status: **Current**

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TITLE	DATE	PUB #	DESCRIPTION / STATUS
AIRFIELD OPENING *Multi-Service Tactics, Techniques, and Procedures for Airfield Opening* **Distribution Restricted**	15 May 07	FM 3-17.2 NTTP 3-02.18 AFTTP(I) 3-2.68	Description: A quick-reference guide to opening an airfield in accordance with MTTP. Contains planning considerations, airfield layout, and logistical requirements for opening an airfield. Status: **Current**
CORDON AND SEARCH *Multi-Service Tactics, Techniques, and Procedures for Cordon and Search Operations* **Distribution Restricted**	25 APR 06	FM 3-06.20 MCRP 3-31.4B NTTP 3-05.8 AFTTP (I) 3-2.62	Description: Consolidates the Services' best TTP used in cordon and search operations. Provides MTTP for the planning and execution of cordon and search operations at the tactical level of war. Status: **Current**
EOD *Multi-Service Tactics, Techniques, and Procedures for Explosive Ordnance Disposal in a Joint Environment* **Approved for Public Release**	27 OCT 05	FM 4-30.16 MCRP 3-17.2C NTTP 3-02.5 AFTTP(I) 3-2.32	Description: Provides guidance and procedures for the employment of a joint EOD force. It assists commanders and planners in understanding the EOD capabilities of each Service. Status: **Current**
IADS *Multi-Service Tactics, Techniques, and Procedures for an Integrated Air Defense System* **Distribution Restricted**	12 OCT 04	FM 3-01.15 MCRP 3-25E NTTP 3-01.8 AFTTP(I) 3-2.31	Description: Provides joint planners with a consolidated reference on Service air defense systems, processes, and structures to include integration procedures. Status: **Revision**
JAOC / AAMDC *Multi-Service Tactics, Techniques, and Procedures for Joint Air Operations Center and Army Air and Missile Defense Command Coordination* **Distribution Restricted**	22 MAR 04	FM 3-01.20 AFTTP(I) 3-2.30	Description: Addresses coordination requirements between the JAOC and the AAMDC. Assists the JFC, JFACC, and their staffs in developing a coherent approach to planning and execution of AMD operations. Status: **Assessment**
JTMTD *Multi-Service Procedures for Joint Theater Missile Target Development* **Distribution Restricted**	11 NOV 03	FM 3-01.51 (FM 90-43) NTTP 3-01.13 AFTTP(I) 3-2.24	Description: Documents TTP for threat missile target development in early entry and mature theater operations. It provides a common understanding of the threat missile target set and information on the component elements involved in target development and attack operations. Status: **Current**
MILITARY DECEPTION **Multi-Service Tactics, Techniques, and Procedures for Military Deception** **Classified SECRET**	12 APR 07	MCRP 3-40.4A NNTP 3-58.1 AFTTP(I) 3-2.66	Description: Facilitate the integration, synchronization, planning, and execution of MILDEC operations. Servce as a "one stop" reference for service MILDEC planners to plan and execute multi-service MILDEC operations. Status: **Current**
NLW *Multi-Service Service Tactics, Techniques, and Procedures for the Tactical Employment of Nonlethal Weapons* **Approved for Public Release**	16 AUG 07	FM 3-22.40 MCWP 3-15.8 NTTP 3-07.3.2 AFTTP(I) 3-2.45	Description: Supplements established doctrine and TTP providing reference material to assist commanders and staffs in planning/coordinating tactical operations. It incorporates the latest lessons learned from real world and training operations and examples of TTP from various sources. Status: **Current**

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TITLE	DATE	PUB #	DESCRIPTION / STATUS
PEACE OPS: *Multi-Service Tactics, Techniques, and Procedures for Conducting Peace Operations* **Approved for Public Release**	26 OCT 03	FM 3-07.31 MCWP 3-33.8 AFTTP(I) 3-2.40	Description: Provides tactical-level guidance to the warfighter for conducting peace operations. Status: **Assessment**
TACTICAL CONVOY OPERATIONS *Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations* **Distribution Restricted**	24 MAR 05	FM 4-01.45 MCRP 4-11.3H NTTP 4-01.3 AFTTP(I) 3-2.58	Description: Consolidates the Services' best TTP used in convoy operations into a single multi-Service TTP. Provides a quick reference guide for convoy commanders and subordinates on how to plan, train, and conduct tactical convoy operations in the contemporary operating environment. Status: **Revision**
TECHINT *Multi-Service Tactics, Techniques, and Procedures for Technical Intelligence Operations* **Approved for Public Release**	9 JUN 06	FM 2-22.401 NTTP 2-01.4 AFTTP (I) 3-2.63	Description: Provides a common set of MTTP for TECHINT operations. Serves as a reference for Service TECHINT planners and operators. Status: **Current**
UXO *Multi-Service Tactics, Techniques, and Procedures for Unexploded Explosive Ordnance Operations* **Approved for Public Release**	16 AUG 05	FM 3-100.38 MCRP 3-17.2B NTTP 3-02.4.1 AFTTP(I) 3-2.12	Description: Describes hazards of UXO submunitions to land operations, addresses UXO planning considerations, and describes the architecture for reporting and tracking UXO during combat and post conflict. Status: **Current**

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TITLE	DATE	PUB #	DESCRIPTION / STATUS
BREVITY *Multi-Service Brevity Codes* **Distribution Restricted**	15 JUN 05	FM 1-02.1 (FM 3-54.10) MCRP 3-25B NTTP 6-02.1 AFTTP(I) 3-2.5	Description: Defines multi-Service brevity codes to augment JP 1-02, *DOD Dictionary of Military and Associated Terms*. It standardizes air-to-air, air-to-surface, surface-to-air, and surface-to-surface brevity code words in multi-Service operations. Status: **Current**
CIVIL SUPPORT *Multi-Service Tactics, Techniques, and Procedures for Civil Support Operations* **Approved for Public Release**	3 DEC 07	FM 3-28.1 NTTP 3-57.2 AFTTP(I) 3-2.67	Description: Fills the Civil Support Operations MTTP void and assists JTF commanders in organizing and employing Multi-Service Task Force support to civil authorities in response to domestic crisis. Status: **Current**
COMCAM *Multi-Service Tactics, Techniques, and Procedures for Joint Combat Camera Operations* **Approved for Public Release**	15 MAY 07	FM 3-55.12 MCRP 3-33.7A NTTP 3-13.12 AFTTP(I) 3-2.41	Description: Fills the void that exists regarding combat camera doctrine and assists JTF commanders in structuring and employing combat camera assets as an effective operational planning tool. Status: **Current**
HAVE QUICK *Multi-Service Tactics, Techniques, and Procedures for HAVE QUICK Radios* **Distribution Restricted**	7 MAY 04	FM 6-02.771 MCRP 3-40.3F NTTP 6-02.7 AFTTP(I) 3-2.49	Description: Simplifies planning and coordination of HAVE QUICK radio procedures. Provides operators information on multi-Service HAVE QUICK communication systems while conducting home station training or in preparation for interoperability training. Status: **Assessment**

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TITLE	DATE	PUB #	DESCRIPTION / STATUS
HF-ALE *Multi-Service Tactics, Techniques, and Procedures for the High Frequency-Automatic Link Establishment (HF-ALE) Radios* **Approved for Public Release**	1 SEP 07	FM 6-02.74 MCRP 3-40.3E NTTP 6-02.6 AFTTP(I) 3-2.48	Description: Standardizes high power and low power HF-ALE operations across the Services and enables joint forces to use HF radio as a supplement / alternative to overburdened SATCOM systems for over-the-horizon communications. Status: **Current**
IDM *Multi-Service Tactics, Techniques, and Procedures for the Improved Data Modem Integration* **Distribution Restricted**	30 MAY 03	FM 6-02.76 MCRP 3-25G NTTP 6-02.3 AFTTP(I) 3-2.38	Description: Provides digital connectivity to a variety of attack and reconnaissance aircraft, facilitates exchange of near-real-time targeting data, and improves tactical situational awareness by providing a concise picture of the multi-dimensional battlefield. Status: **Revision**
IFF *MTTP for Mark XII IFF Mode 4 Security Issues in a Joint Integrated Air Defense System* **Classified SECRET**	11 DEC 03	FM 3-01.61 MCWP 3-25.11 NTTP 6-02.2 AFTTP(I) 3-2.39	Description: Educates the warfighter to security issues associated with using the Mark XII IFF Mode 4 Combat Identification System in a joint integrated air defense environment. Captures TTP that addresses those security issues. Status: **Revision**
JATC *Multi-Service Procedures for Joint Air Traffic Control* **Distribution Restricted**	17 JUL 03	FM 3-52.3 (FM 100-104) MCRP 3-25A NTTP 3-56.3 AFTTP(I) 3-2.23	Description: Provides guidance on ATC responsibilities, procedures, and employment in a joint environment. Discusses JATC employment and Service relationships for initial, transition, and sustained ATC operations across the spectrum of joint operations within the theater or AOR. Status: **Assessment**
JTF IM *Multi-Service Tactics, Techniques, and Procedures for Joint Task Force Information Management* **Distribution Restricted**	10 SEP 03	FM 6-02.85 (FM 101-4) MCRP 3-40.2A NTTP 3-13.1.16 AFTTP(I) 3-2.22	Description: Describes how to manage, control, and protect information in a JTF headquarters conducting continuous operations. Status: **Assessment**
JTF LNO Integration *Multi-Service Tactics, Techniques, and Procedures for Joint Task Force (JTF) Liaison Officer Integration* **Distribution Restricted**	27 JAN 03	FM 5-01.12 (FM 90-41) MCRP 5-1.B NTTP 5-02 AFTTP(I) 3-2.21	Description: Defines liaison functions and responsibilities associated with operating a JTF. Status: **Assessment**
REPROGRAMMING *Multi-Service Tactics, Techniques, and Procedures for the Reprogramming of Electronic Warfare and Target Sensing Systems* **Distribution Restricted**	22 JAN 07	FM 3-13.10 (FM 3-51.1) NTTP 3-51.2 AFTTP(I) 3-2.7	Description: Supports the JTF staff in planning, coordinating, and executing reprogramming of electronic warfare and target sensing systems as part of joint force command and control warfare operations. Status: **Current**
RISK MANAGEMENT **Approved for Public Release**	15 FEB 01	FM 3-100.12 MCRP 5-12.1C NTTP 5-03.5 AFTTP(I) 3-2.34	Description: Provides a consolidated multi-Service reference, addressing risk management background, principles, and application procedures. Identifies and explains the risk management process and its differences and similarities as it is applied by each Service. Status: **Assessment**
TACTICAL RADIOS *Multi-Service Communications Procedures for Tactical Radios in a Joint Environment* Approved for Public Release	14 JUN 02	FM 6-02.72 MCRP 3-40.3A NTTP 6-02.2 AFTTP(I) 3-2.18	Description: Standardizes joint operational procedures for SINCGARS and provides an overview of the multi-Service applications of EPLRS. Status: **Assessment**
UHF TACSAT/DAMA *Multi- Service Tactics, Techniques, and Procedures Package for Ultra High Frequency Tactical Satellite and Demand Assigned Multiple Access Operations* **Approved for Public Release**	31 AUG 04	FM 6-02.90 MCRP 3-40.3G NTTP 6-02.9 AFTTP(I) 3-2.53	Description: Documents TTP that will improve efficiency at the planner and user levels. (Recent operations at JTF level have demonstrated difficulties in managing limited number of UHF TACSAT frequencies.) Status: **Assessment**

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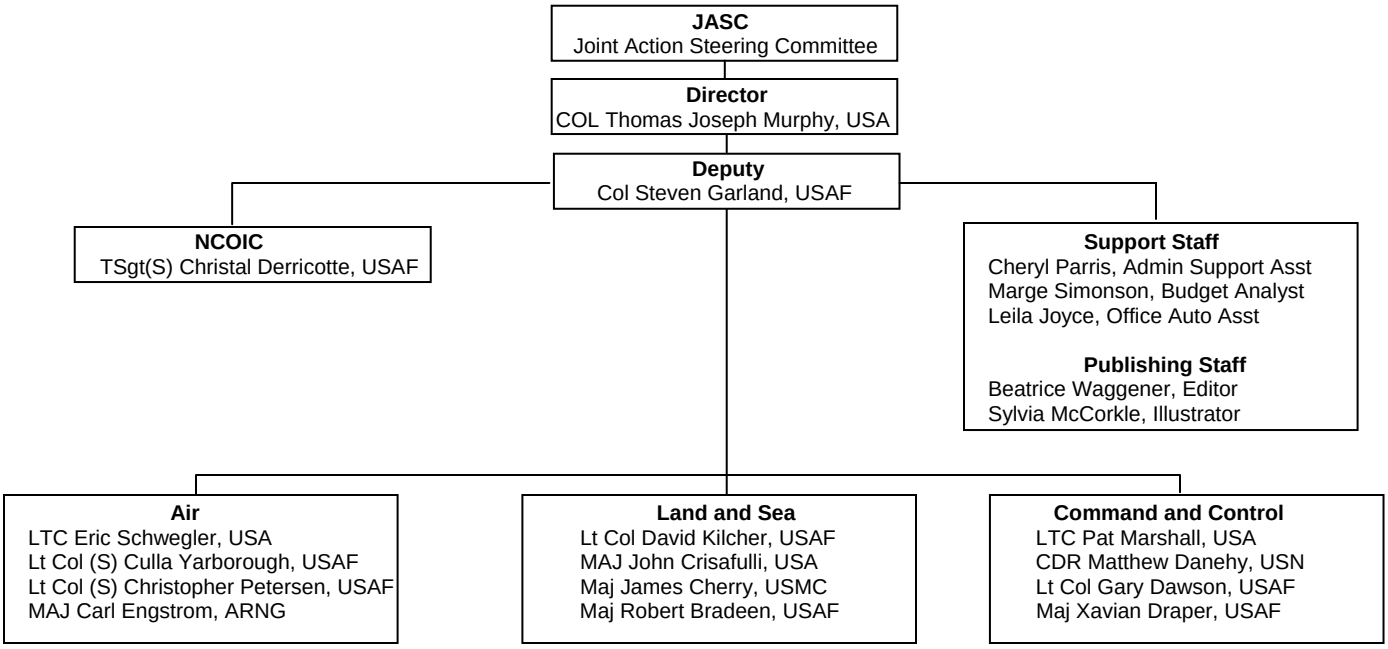

- Air Defense of the US (ADUS)
- Aviation Urban Operations
- Joint Application of Firepower (JFIRE)
- Joint Surveillance Target Attack Radar System (JSTARS)
- Kill Box
- Suppression of Enemy Air Defenses (JSEAD)
- Survival, Evasion, and Recovery
- Tactical Employment of UAS (UAS)
- Targeting Time-Sensitive Targets (TST)
- Theater Air-Ground System (TAGS)

- Airfield Opening
- Conducting Peace Operations (PEACEOPS)
- Cordon and Search
- Explosive Ordnance Disposal (EOD)
- Integrated Air Defense System (IADS)
- Joint Air Operations Center and Army Air and Missile Defense Command Coordination (JAOC/AAMDC)
- Joint Theater Missile Target Development (JTMTD)
- Military Deception (MILDEC)
- Nonlethal Weapons (NLW)
- Tactical Convoy Operations (TCO)
- Technical Intelligence (TECHINT)
- Unexploded Explosive Ordnance Operations (UXO)

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- Have Quick Radios
- High Frequency-Automatic Link Establishment Radios (HF-ALE)
- Improved Data Modem Integration (IDM)
- Joint Air Traffic Control (JATC)
- Joint Task Force Info Mgmt (JTF-IM)
- Joint Task Force LNO (JTF-LNO)
- Mark XII IFF Mode 4 Security Issues (IFF)
- Reprogramming of Electronic Warfare and Target Sensing (Reprogramming)
- Risk Management
- Tactical Radios
- Ultra High Frequency Tactical Satellite and Demand Assigned Multiple Access Operations (UHF TACSAT/DAMA)

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